

TITLE: Foldable Portable Cooler with Enhanced Over-Center Locking Handle

Cross Reference to Related Application

This application is a Continuation-in-Part of our prior pending U. S. utility patent application, Serial Number 10/295,171, Filed November 15, 2002, and entitled "Quick-Opening Foldable Portable Cooler," which was in turn based upon prior Provisional Patent Application, Serial Number 60/333208, Filed: 11/16/01, that was also entitled "Quick-Opening Foldable Portable Cooler."

Background of the Invention

I. Field of the Invention

17 This invention relates generally to portable, foldable corrugated or cardboard
18 containers. More particularly, our invention relates to corrugated boxes that fold from a flat
19 shipping state to a durable, deployed state for storing beverage containers with ice, including
20 rugged deployable handles that enable hand-carrying of the container at the same time.
21 Known prior art that is germane to the invention because of handle construction is classified
22 in U. S. Class 229, Subclasses 179, and 117.13 and 117.14.

II. Description of the Prior Art

25 Numerous portable, box-like containers have previously been proposed for
26 temporarily storing and thermally-isolating foods or beverages. Containers comprising
27 portable, disposable "coolers" are typically folded together from flat blanks, and then

1 constrained by glue or staples, or other, separately-installed mechanical fasteners. Suitable
2 blanks, as well recognized in the art, are usually made of paperboard, cardboard, or
3 corrugated material. Typical "coolers" are subject to significant stresses, resulting from their
4 internal load, and the rough and haphazard handling to which they are subjected during
5 normal use. It is well recognized in the art that such containers will be treated carelessly and
6 indifferently by their owners. Coolers will inevitably be subjected to physical abuse, from
7 vibration, pounding, and dropping. Since modern coolers constrain a hefty quantity of ice
8 cubes and a six-pack or two of a desired beverage, design considerations relating to weight,
9 strength and endurance are commercially important.

10 Typical disposable cartons or "coolers" are variously sized to accommodate a
11 substantial load of ice cubes together with several beverage containers. When a large volume
12 of ice is combined with numerous twelve to sixteen ounce bottles or cans, a relatively heavy
13 weight results. Because of this relatively heavy weight load, typical containers may be
14 inconvenient to transport without adequate handle structures. However, the handles must be
15 rugged and durable, as such containers will be routinely subjected to rough, and casual
16 treatment.

17 Aggravating the necessity for rugged design is the fact that the ice held by the
18 container will of course melt eventually, and as water is absorbed into the corrugated or
19 paperboard structure, those designs that have not been adequately waterproofed will soon
20 collapse. Of course it is desirable that suitable coolers temporarily contain the melt-down, so
21 that leaking water does not escape the cooler and damage the users vehicle, clothing, or
22 possessions. Of course, the previously discussed misuse to which such containers are
23 routinely subjected further aggravates commercial design imperatives.

24 Because of the strain of the heavy load often borne by these increasingly popular
25 corrugated containers, the handle structure may be the first piece to fail. Often the handle
26 structures are added to the assembled blank after appropriate folding. Many handle designs
27 exist, and a variety of interconnection schemes are known. For example, in our copending
28 utility patent application, entitled Quick Erecting Foldable Portable Cooler, Serial Number
29 10/295,171, filed November 15, 2002, the handle is a separate part, comprising a pair of
30 spaced-apart ends, each of which is equipped with integral feet that anchor beneath receptive
31 holes formed in the cooler.

1 In addition to the foregoing considerations, the commercial success and/or market
2 practicability of the candidate corrugated coolers is inexorably linked to common market
3 factors like the cost of production, the cost of shipment, and the ease of use. Where as here
4 the product is represented as being "disposable," a low cost is obviously a root consideration.
5 Although the strongest available corrugated coolers are routinely assembled by the beverage
6 vendor, rather than the retail beverage consumer, it is imperative for cost minimization that
7 the candidate cooler be shippable in a flat, unassembled form. Further, a proper design must
8 abrogate the typical requirement of mechanical staples or other fasteners. Finally, the
9 assembled container must be durable and waterproof, at least for a significant portion of its
10 intended or expected useful life, which can vary between three to five hours when subjected
11 to conditions of hard use. Ideally the handle structure should not involve separate parts that
12 necessitate end-user assembly. It is desirable in some cases for the handle structure to be
13 inherent in the blank's construction; in other words, a commercially ideal, ruggedized cooler
14 design should include integral handles formed by cooperating blank panels or segments. The
15 design must be resistant to water and other liquids, and it should withstand appreciable misuse
16 while heavily loaded for substantial time periods.

17 U. S. Pat. No. 5,284,294 discloses a disposable container made from an integral blank
18 of corrugated cardboard that folds between flat, storage orientations and an erected or
19 deployed configuration. The container is adapted to store beverages or other articles, in an
20 appealing, iced down condition. A bottom wall is foldably attached to two pairs of side walls
21 that are joined by pleated walls, forming a "seamless" interior when assembled. The latter
22 feature is important for leak-proofing. The container walls are self-locking without external
23 staples or fasteners. A moisture-proof coating formed on the box interior further minimizes
24 potential leakage. One of the top walls has a panel with lateral locking tabs that fold down
25 during cooler assembly and are mated to receptive slots formed by the upright walls. The
26 carrying handle is formed from abutting cutouts.

27 Prior U. S. Pat. No. 5,062,527, which issued November 5, 1991, and which was
28 invented by one of the inventors common to this case, disclosed a "Foldable, leakproof multi-
29 mode Carton Construction" and a blank that is similar to the instant invention's blank. The
30 slotless and leakproof cooler disclosed therein is ideal for storing and transporting regulated
31 medical waste. The corrugated, cooler blank can be quickly folded to form the cooler.

1 Preferably, a separate plastic liner is provided to waterproof the cardboard or corrugated
2 material interiorly. Each blank comprises a center panel, a pair of bordering side panels, a pair
3 of bordering end panels, and four corner panels. The scoring lines comprise a first pair of
4 spaced apart, parallel fold lines extending longitudinally, and a second pair of parallel fold
5 lines crossing the width of the blank. Diagonal fold lines are scored into the corner panels.
6 The center panel forms a bottom of the cooler, and the width and length panels respectively
7 form cooler ends and sides. The corner panels foldably divide into separate segments which
8 abut each other and overlie the length panels. A knock down system that permits erected
9 coolers to be flattened, includes a knock down line which evenly bisects the blank and a
10 cooperating pair of groups of generally triangular relief lines formed in the center panel. The
11 assembled cooler may be flattened by urging the length panels together, whereupon the width
12 panels will fold into the carton interior. A similar deforming movement facilitated by the
13 triangular relief lines enables the center panel to collapse outwardly from the carton.

14 U. S. Pat. No. 5,094,359 discloses an ice cooler adapted to be disposed in a minimum
15 volume disposition for shipping, which is thereafter expanded upon erection. Cooler end and
16 side panels comprise foldable flaps that close the container. The foldable flaps are uncoupled
17 to expose the container interior and facilitate and increase in resultant size to allow the
18 introduction of beverage containers and a quantity of ice.

19 U. S. Pat. No. 5,020,337 issued June 4, 1991, and entitled "Combination ice package
20 and Expandable Cooler" comprises a box-like cooler comprising an extendable upper portion
21 consisting of folded cardboard flaps. Expanding top flaps fold to form a top seal through the
22 use of mating notches which frictionally engage one another. The upper portion of the
23 structure is provided with circular access areas through which drinks may be inserted while
24 being consumed.

25 U. S. Pat. No. 5,562,228 discloses a collapsible cooler comprising a floor surrounded
26 by a plurality of foldable walls interconnected by a hinge. Internal container subassemblies
27 include quantities of a heat transfer material. Peripheral hinges connect the floor module and
28 the lower wall subassemblies for securing the lower wall subassemblies to the floor assembly.
29 Flexible corner panels are connected between adjacent, foldable wall assemblies. A carry
30 strap assembly which includes a first end is connected to one upper wall subassembly, and a
31 second end of the carry strap assembly is connected to an opposite upper wall subassembly. A

1 lid assembly with a handle is adapted to fit onto upper edges of the respective upper wall
2 subassemblies.

3 U. S. Pat. No. 5,303,863 issued April 19, 1994, discloses a corrugated container
4 having a compartment for multiple beverage containers, and means for holding ice. The
5 comprising a plurality of panels arranged in stacked relationship when deployed. The panels
6 are unfolded to form an ice bin atop the compartment. Bottles or cans are cooled by direct
7 contact with the ice stored within the bin. By first withdrawing plural cans from the
8 compartment, pouring in ice, and then nestling the withdrawn cans back into the bin ice, most
9 cans in directly contact the ice.

10 U. S. Pat. No. 4,119,265 issued October 10, 1978, and entitled "Seamless leakproof
11 container " discloses a cooler made from a single, generally rectangular corrugated blank. A
12 pair of triangular corner panels first folded together into face-to-face contact are folded over
13 the ends of a box as the four sides of the rectangular blank are raised to form the side and end
14 panels of a five-sided box. A cover panel is integrally joined to one edge of a side panel, to
15 swing down and close the box.

16 U. S. Pat. No. 5,307,986, entitled "Expandable watertight article carrier" discloses a
17 cooler comprising top and side panels interconnected by gusset panels. When the gusset
18 panels are relaxed, the side and end panels are released to pivot about their foldable
19 connection to the bottom panel to expand the interior of the carrier while maintaining the
20 carrier in watertight condition.

21 U. S. Pat. No. 4,784,497 issued Nov. 15, 1988 teaches a flat, paperboard blank that
22 can be conveniently carried and readily assembled into a rectangular carton for disposal of
23 small litter such as cups, cans, and tissues.

24 Through experimentation with numerous handle designs, in conjunction with portable
25 foldable coolers of the type generally described above, we have invented a disposable and
26 portable cooler with integral handles that adequately support relatively large loads, while at
27 the same time locking the unit into a desired stable condition.

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Summary of the Invention

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4 containers and generous quantities of ice. Our cooler is deployed quickly and efficiently by
5 folding a pre-scored, corrugated blank. A vertically upright handle is formed from abutting
6 panels that are integrally locked together by angled locking panels when assembled. When the
7 cooler panels are folded together through the construction disclosed, the container is pre-
8 stressed and thus strengthened in response to weight borne and distributed angularly by the
9 handle.

10 Additionally our ice cooler quickly deploys from a flat "minimal volume" storage
11 position in which numerous blanks may be stored atop one another in layers. The inherently
12 "slotless" blank co-features a "knock-down" bottom, enabling quantities of partially-erected
13 boxes to be shipped with minimal volume. After proper deployment, the resultant cooler has
14 no proactive leak paths, so that it does not spill or leak water from melting ice.

15 The rectangular blank that is die-cut from corrugated sheet stock is preferably
16 waterproofed with a thin polyethylene coating. Each blank comprises a generally rectangular
17 center panel integrally bordered by a pair of integral end panels and a pair of integral side
18 panels. Four integral, diametrically spaced apart corner panels interconnect the center panel
19 with the end and side panels. Score lines proximately defined between the adjacent panels
20 facilitate subsequent folding.

21 The center panel forms a cooler bottom, and the cooler end and side panels
22 respectively form carton ends and sides when deployed. When various panels are folded
23 vertically upwardly, the corner panels will bend across the diagonal fold lines, forming twin,
24 generally triangular abutting segments that make surface-to-surface contact. These segments
25 are foldably tucked away into the cooler interior after box erection, and they are retained by
26 properly folding the end panel flaps downwardly into the cooler interior. Thus, our cooler has
27 no slots or inherent leak paths.

28 Each end panel has an outer locking panel integrally formed at its outer edge and
29 shaped generally like an hourglass. The locking panels comprise a pair of mirror images, or
30 trapezoidal halves adapted to be folded together. Each side panel has an integral, outer handle

1 panel that, after folding, forms a carrying handle. Each handle panel comprises an inner roof
2 segment that forms half of the cooler top, and which is separated from the adjoining handle
3 segment by a fold line. In assembly, the handle panels are frictionally mated to the locking
4 panels. In the best mode, the resulting handle is disposed vertically, with the locking panels
5 captivated by the handle panels at an angle of approximately forty-five degrees. The handle
6 portion includes an elongated hand hole, thereby enabling carrying.

7 A pair of upper and outer, spaced apart locking tabs extend from the outermost corners
8 of the handle portions to inclined, angularly disposed locking notches. An adjacent, specially
9 shaped ramp formed on the tabs mates within suitably configured, receptive slots formed in
10 the locking panels. Each locking panel is a two-ply arrangement of added strength. Aligned
11 slots in the abutting locking panel halves are penetrated by the handle panel locking tab
12 during folding. As the tab is inserted, gradually increasing resistance is experienced upon
13 initial engagement as a result of the increasing radius of the tab contour. As forcible folding
14 of the locking portions against the handle portion tabs concludes, the receptive locking slot
15 forcibly admits the locking tab. However, resistance decreases as folding ends and assembly
16 is completed, because the ramp (i.e., on the handle portion locking tab) slides over the
17 uppermost edge within the receptive slots in the locking panel. Then, locking occurs within
18 an adjacent captivation notch within the handle segment. Because of the configuration of the
19 locking tab ramp, an “over center” action is achieved by frictional contact within the receptive
20 slot, and the locking panel is hooked by and held within the captivation notch.

21 The described locking arrangement is strengthened by the inability of the locking
22 panels to escape the locking tabs, once registered within the captivation notches. Further, the
23 angular and two-ply construction of the locking panel distributes weight through vector
24 resolution, enhancing cooler strength and durability. Use of a packed cooler subjects the
25 handle to appreciable weight, which pre-stresses the structure to maintain its shape.

26 Thus, a broad object of our invention is to provide a highly reliable and durable
27 handle-equipped cooler for containing generous amounts of ice and beverages.

28 Another broad object of our invention is to provide a cooler of the character described
29 with a rugged, integral handle structure that is integrally formed from portions of the blank
30 without separate parts.

1 Another basic object is to provide an inexpensive blank which easily folds into a
2 durable cooler with an integral handle of the character described.

3 Another important object is to provide an improved cooler made from a slotless,
4 corrugated blank that may be readily transformed between a relatively flat storage
5 configuration, and a secure, box-like cooler configuration with an integral handle.

6 Yet another object is to provide such an improved, disposable cooler that is
7 lightweight and strong, and yet which is resistant to water leaks.

8 A related object is to provide a disposable ice cooler of the character described that
9 occupies a minimal shipping volume.

10 A still further object is to provide a cooler including an integral handle that may be
11 formed simply by folding a corrugated blank, but which may be easily flattened into a
12 transportable or storage position.

13 Another fundamental object of our invention is to provide an easily carried and
14 inexpensive cooler that will store ice and a plurality of bottles or cans without leakage or that
15 will collapse for a relatively long period of time.

16 A further basic object is to provide a cooler of the character described that will
17 function reliably even when abused.

18 Another important object is to provide a reliable beverage ice cooler that replaces
19 conventional, environmentally-unfriendly styrofoam coolers.

20 Yet another object is to provide a rugged, foldable cooler which, when lifted up by its
21 handle, strengthens rather than weakens.

22 An additional object of our invention is to provide a cooler of the character described
23 which may be readily assembled from a single, integral, pre-scored blank.

24 Yet another object is to provide a foldable cooler which is effective for storing warm
25 or cold products for moderate periods of time.

26 Another important object is to provide a cooler design of the character described, and
27 a blank for such a cooler, which may be selectively deployed in flat and/or fully or partially
28 set-up orientations, without separate handle components.

29 Yet another object is to provide a disposable cooler which is easily folded between flat
30 storage positions and deployed, thereby having generally cubical configurations.

1 In other words, an important object of our new cooler is to minimize complexity and
2 set-up difficulty.

3 Yet another object of our construction is to make an improved disposable cooler
4 whose inherent handle locking feature provides a strong and secure connection between
5 foldable parts.

6 These and other objects and advantages of the present invention, along with features
7 of novelty appurtenant thereto, will appear or become apparent in the course of the following
8 descriptive sections.

Brief Description of the Drawings

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11 In the following drawings, which form a part of the specification and which are
12 to be construed in conjunction therewith, and in which like reference numerals have
13 been employed throughout wherever possible to indicate like parts in the various views:

14 FIGURE 1 is a perspective view of the corrugated, pre-scored blank that can be
15 folded, as hereinafter described, to form a cooler equipped with locking handles;

16 FIGURES 2-9 are perspective views showing various sequential stages as the blank is
17 folded to form the cooler;

18 FIGURE 10 is an enlarged, fragmentary plan view derived from a point of view
19 looking along line 10-10 in Figure 9; and,

FIGURES 11 and 12 are perspective views showing various sequential stages as the erected box is collapsed into a flat, easily stored and transported configuration.

Detailed Description of the Preferred Embodiment

With reference now directed to the appended drawings (Figures 2-12), our improved cooler has been generally designated by the reference numeral 20. Our cooler 20 comprises a box-like, generally cubicle cooler formed by appropriately folding a generally planar blank 24 (Fig. 1), as hereinafter described. As will be appreciated by those skilled in the art, the size and dimensions of blank 24 may be varied as desired to construct coolers or containers of different volumes, geometrical configurations, and sizes. Cooler 20 is primarily intended to hold ice and miscellaneous beverage containers; a variety of other items can be stored as well. To form cooler 20, blank 24 is transformed into the cooler 20 as folding progresses

1 according to the preferred erection sequence illustrated in Figures 2-9. When folded as
2 previously mentioned, blank 24 forms so that no leak paths and a substantially waterproof
3 arrangement results. After erection, the cooler may be flattened for storage or shipping as
4 hereinafter described. Importantly, an integral, upright handle 25 (i.e., Figs. 6, 7, 9) is
5 disposed at the upper center of the cooler 20, and its angular construction pre-stresses the
6 cooler structure for enhanced durability and overall strength.

7 Blank 24 (Fig. 1) is preferably formed from a die-cut piece of corrugated sheet
8 material. Blank 24 can be produced through a variety of techniques known in the art, and it
9 can be made from waterproof paperboard, fiber or plastic sheet materials, or different forms
10 and types of commercial-grade cardboard or heavy weight paper. Preferably, the blank
11 surface 21 facing the viewer in Figure 1 is coated with polyethylene plastic for moisture
12 resistance. As revealed in Figure 1, blank 24 is preferably rectangular, having a length
13 somewhat greater than its width. The longitudinal center axis is generally coincident with the
14 central score lines, and has been generally designated by the reference numeral 23. The
15 blank's length runs generally from the left to the right as viewed in Figure 1. Blank 24 has
16 been appropriately scored by numerous intersecting score lines that divide the blank into a
17 plurality of separate but integral panels. When blank 24 is folded to form the cooler 20, the
18 preferred steps involved are partially illustrated in sequential form in consecutive Figures 2-9,
19 and each of the individual component panels seen in Figure 1 will form various body portions
20 of the deployed cooler 20.

21 For purposes of clarity, it should be appreciated that the upper or top surface
22 projecting towards the viewer in Figure 1 becomes the interior surface of the cooler 20 after
23 folding. Of course the various panels and portions of panels exposed in Figure 1 have a
24 corresponding undersurface not seen until folding occurs. The undersurface of each numbered
25 panel identified by a given reference numeral in Figure 1 will be hereinafter designated in
26 succeeding drawing Figures by the same reference numeral with the suffix "A" appended to it.

27 The preferred blank 24 (Fig. 1) comprises a generally rectangular center panel 28 that
28 has integral end panels 30, 31 bordering its ends. When the cooler is assembled, center panel
29 28 will form the bottom of the container, and end panels 30 and 31 will form container ends.
30 Outer locking panels 33, 34 are respectively integral with end panels 30, 31. In their
31 preassembly unfolded orientation, the locking panels 33, 34 (Fig. 1) have a generally

1 hourglass shape. Upon subsequent folding, the locking panels assume a two-ply, generally
2 trapezoidal configuration (i.e., Fig. 8) as hereinafter described. Each locking panel 33, 34
3 comprises adjoining, mirror image trapezoidal halves 32, which are separated from one
4 another by a fold line 29 (Fig. 1). Elongated, receptive slots 35 are defined in each locking
5 panel half 32, and these slots are aligned in assembly when halves 32 are folded together to
6 form the composite locking panel. Blank 24 further comprises four, integral, corner panels
7 36, 37, 38 and 39, and integral side panels 40, 41 bordering its sides. When the cooler is
8 assembled, side panels 40, 41 will form the sides of the container, and the corner panels will
9 be tucked away into the interior. The diametrically spaced-apart corner panels 36-39
10 interconnect the center panel 28 with the end panels 30 and 31 and with the side panels 40,
11 41. Side panels 40, 41 preferably comprise integral, handle panels 43, 44 respectively.

12 The handle panels 43, 44 are preferably mirror images of one another. Each handle
13 panel is divided into a generally rectangular roof segment 42 and an integral handle segment
14 45, that includes an elongated carrying hole 46 through which one's fingers may extend when
15 grasping the handle 25 (Fig. 8). After folding, the deployed roof segments 42 lie in a
16 common plane at the top of the cooler and form its flat top. The handle segments 45 flatly
17 abut one another and occupy a vertical plane, with handle segments 45 and carrying holes 46
18 aligned.

19 Importantly, the handle segment 45 is specially configured. With primary reference
20 directed to Figure 10, in which undersurface 45A of the lower handle segment 45 in Figure 1
21 faces the viewer, the illustrated corner section is greatly enlarged. The corner sections of each
22 handle segment are mirror images, so only one corner need be discussed in detail. Each corner
23 forms a radius locking tab 47 that in assembly penetrates the aligned receptive slots 35 (Fig.
24 1) in the locking panels. The outer radius 48 (Fig. 10) of each tab curves inwardly towards an
25 enlarged radius portion 49, that adjoins a captivation notch 50, that seats and captivates the
26 locking panels by hooking the locking slots 35 (Fig. 1). In other words, a piece of the central
27 portion 52 (Fig. 1) of a folded-together locking panel, that forms the top of the aligned,
28 composite locking slot 35, is locked within captivation notch 50 and prevented from
29 withdrawal by enlarged tab radius portion 49 (Fig. 10). The locking notch is aligned with the
30 inclined edge 51 of the upper handle segment 45/45A (Fig. 10), and it projects towards the top
31 54 thereof. Thus the locking panel receptive slots 35 are penetrated and engaged by the

1 locking tabs 47 (Fig. 9). Frictional force increases as the latter parts are pressed together, as
2 contact is first made along radius 48 (Fig. 10), and force peaks when enlarged radius portion
3 49 is engaged. Immediately afterwards, the tension releases somewhat, as portion 49 is
4 passed, and the upper edge of the composite receptive slot 35 becomes nested and locked
5 within captivation notch 50 (Fig. 10). This “overcenter action” allows the handle to in effect
6 be locked into the desired configuration. At the same time, the roof segments 42/42A will be
7 disposed horizontally, as in Fig. 7.

8 The locking panels are transformed from their hourglass configuration to a two-ply
9 trapezoidal configuration when halves 32 are first folded about line 29 (Fig. 1). In assembly,
10 the locking panels 33, 34 form a lock when they are press-fitted against the handle segments
11 45 on the opposite ends (i.e., Fig. 9). It is preferred that the locking panels are inclined
12 relative to the horizontal, i.e., they are angled relative to the roof panels. Preferably, the
13 locking panels couple to the handle segments at an acute angle of approximately forty to fifty
14 degrees, with forty-five degrees preferred. Vertical forces experienced by the handle 25 (i.e.,
15 Fig. 9) will pull on the folded locking panels 33, 34, and their angular orientation will direct
16 forces both horizontally and vertically. In other words, handle-applied forces transmitted to
17 the cooler 20 will be dispersed and divided through vector resolution into both horizontal and
18 vertical components. In effect, the vector resolution of these potentially damaging forces not
19 only pre-stress and pre-tension the cooler 20 to strengthen it, but ensures that the locking
20 system does not fail.

21 Numerous fold lines proximately defined between the above discussed, orthogonally
22 arranged panels are scored into the blank 24. These score lines facilitate subsequent folding of
23 adjacent panels or segments. A pair of elongated, spaced apart fold lines 70, 71 (Fig. 1)
24 extend the length of the blank 24 and separate the side panels 40, 41 and the corner panels 36-
25 39 from the central panel 28 and end panels 30 and 31 (Fig. 1). A similar pair of elongated,
26 spaced apart fold lines 75, 76 perpendicularly running the width of blank 24 separate the end
27 panels 30, 31 and the corner panels 36-39 from the central panel 28 and side panels 40, and
28 41. An interior, elongated, double-scored fold line 80 is aligned with the longitudinal axis 23
29 and receptive slots 35; it traverses the entire blank 24 and divides it in half.

30 Each corner panel 36-39 is similarly sized and configured. Each is somewhat square,
31 with an outer notch 59 (Figs. 1, 2) cut into diametrically, outwardly extending vertice. Each

1 corner panel 36-39 has a diagonal score line 92 defined through its center, running from a
2 vertice of central panel 28 to the notch 59 that enables leak-proof folding. Central panel 28 is
3 preferably provided with an array of knock-down score lines, generally designated by the
4 reference numeral 99. The generally V-shaped arrays 99 each comprise multiple, independent
5 and angled score lines that enable the partially completed cooler 20 to be "knocked down" or
6 non-destructively and temporarily "squashed" for transport or temporary storage, as depicted
7 in Figure 11 and 12. The latter phenomena is explained in detail in prior U. S. Pat. No.
8 5,062,527, entitled "Foldable, leakproof multi-mode Carton Construction," which issued
9 November 5, 1991, and which is owned by the same assignee as in this case,. The latter
10 patent, including its text and drawings, are hereby incorporated by reference for purposes of
11 disclosure.

12 **Preferred Assembly:**

13 Those with skill in the art will immediately recognize that various assembly steps may
14 be juxtaposed during box erection. Although the order of folding may be varied, the
15 preferred steps are sequentially illustrated by Figures 2-9.

16 Folding commences as in Figures 2, with the corner panels 36-39 pushed together to
17 fold upon themselves about fold lines 59, and to thereafter nest within the "box" formed by
18 the other panels. In Figure 3, the blank 24 has been formed into a box-like enclosure as the
19 side and end panels have been arranged vertically around the central panel, with the corner
20 panels nested inwardly. The handle panels 43, 44 are then moved vertically upwardly into the
21 position of Figures 4 and 5. The locking panels 33, 34 can also be urged through an
22 intermediate vertical position during assembly, as depicted in Figure 5. Then handle segments
23 45 and roof segments 42 are folded over score line 66 (i.e., Figs. 2, 4), so that roof segments
24 42/42A are horizontally laid flat on top of the cooler, and the handle segments 45,45A are
25 disposed vertically in side by side relationship (Figs. 6, 7).

26 At this point the critical locking panel halves 32 may be folded over score line 29
27 towards the orientation seen in Figure 7. When halves 32 of each locking panel 33, 34 are
28 folded flatly together as seen in Figure 8 , the locking panels may be pressed into engagement
29 with the locking tabs 47 (Figs. 9, 10) and snapped into locking engagement wherein locking
30 tabs 47 (Fig. 10) are captivated within the locking slots 35, registered within and locked
31 within, and by captivation notch 50 (Fig. 10).

1 From the foregoing, it will be seen that this invention is one well adapted to obtain all
2 the ends and objects herein set forth, together with other advantages which are inherent to the
3 structure.

4 It will be understood that certain features and subcombinations are of utility and may
5 be employed without reference to other features and subcombinations. This is contemplated
6 by and is within the scope of the claims.

7 As many possible embodiments may be made of the invention without departing from
8 the scope thereof, it is to be understood that all matter herein set forth or shown in the
9 accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

10 WE CLAIM:

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